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showed a valuable series of Mammalian brains, together with other comparative anatomical preparations.

The following new members were elected:

J. G. Adami, M. A., M. D., M. R. C. S., Professor of Pathology, McGill University.

T. B. Aldrich, M. D., Instructor in Physiological Chemistry, Johns Hopkins University.

J. McK. Cattell, Ph. D., Professor of Experimental Psychology, Columbia College.

G. P. Clark, M. D., Professor of Physiology, Syracuse University.

R. H. Cunningham, M. D., Assistant Demonstrator of Physiology, College of Physicians and Surgeons, Columbia College.

G. W. Fitz, M. D., Assistant Professor of Physiology and Hygiene, Harvard University.

T. Hough, Ph. D., Assistant Professor of Physiology, Massachusetts Institute of Technology.

R. Hunt, A. B., Fellow in Physiology, Johns Hopkins University.

F. S. Locke, M. A., M. B., Instructor in Physiology, Harvard Medical School.

Professors C. S. Minot and C. F. Hodge were appointed to express to Prof. Langley the opinion of the Society that it is highly desirable that the table of the Smithsonian Institution at the Naples Zoölogical Station be continued. Mr. W. B. Saunders entertained the members of the Society at luncheon at the Art Club. The Society enjoyed also the courtesies that were extended to the affiliated societies by the University of Pennsylvania and the Philadelphia Local Committee.

Officers for the coming year were elected as follows: Members of the Council, H. P. Bowditch, R. H. Chittenden, W. H. Howell, F. S. Lee, J. W. Warren; President, R. H. Chittenden; Secretary and Treasurer, F. S. Lee.

The President and the Secretary were appointed respectively Delegate and Alternate

to the Congress of American Physicians and Surgeons of 1897.

FREDERIC S. LEE,
Secretary.

THE PHILADELPHIA MEETING OF THE AMERICAN PSYCHOLOGICAL ASSOCIATION.

At the Princeton meeting of the Association a year ago overtures of affiliation were received from the American Society of Naturalists, and in response to these the meeting of 1895 was held at the same time and place as those of the affiliated societies. The opportunities thus afforded of seeing and hearing distinguished representatives of kindred lines of investigation added much to the interest of the psychological program, while the abundant hospitality of the local committee provided for the social contact, which is rightly an important feature of all such gatherings.

On opening the first session of the Association, the President, Prof. Cattell, of Columbia, introduced Prof. Fullerton, Dean of the University of Pennsylvania, who first welcomed the Association to the University and then read a paper on *Psychology and Physiology*. In it he drew the boundary between the two sciences sharp, not with any view to warning off mutual trespass, but to having the writers of text-books keep clear for their readers the essential limits of both sciences. With Foster's Physiology as a text Prof. Fullerton showed what lavish use is made in the chapters on the functions of the sense organs and the nervous system of material that is patently psychological, *i. e.*, secured by the distinctly psychological method of introspection. This paper appears in full in the current number of the *Psychological Review*.

Prof. Fullerton was followed by Dr. Farland, of Columbia, who described a *Series of Physical and Mental Tests on the Students of Columbia College*. The tests described are made on the undergraduates of the College

at entrance, and repeated upon the same students at the end of their Sophomore and Senior years. The object of the tests is to obtain a record for comparative purposes of certain mental and physical characteristics of the students at different times during a period of rather active intellectual growth, and at the same time to furnish material for a statistical study of the particular points examined. Stress is laid to a certain extent upon the more purely mental inquiries, such as memory, rate of perception, and motor response, accuracy of perception, color vision, etc., but enough physical tests are included to afford a comparison between bodily and mental development if any relation between the two exists. Dr. Farrand's paper led to a discussion of the advantages of such prolonged statistical inquiries, at the conclusion of which, on motion of Prof. Baldwin, of Princeton, the Association voted to appoint a committee to consider the matter of the coöperative collection of such data by the various psychological laboratories. This committee, as announced at the business meeting, is composed of Professors Baldwin, Jastrow, Sanford, Witmer and Cattell (chairman).

Dr. Arthur MacDonald's paper on *Some Psycho-Neural Data* was a report upon experiments similar to those reported on by the same speaker at the Princeton meeting (see SCIENCE, I., 43), but this time including, besides experiments upon pain, others on discriminative sensitivity of the skin (Weber's circles), and just observable differences in warmth. The experiments were regarded rather as tests of tests than as leading to definitive results, but they nevertheless appeared to indicate some interesting relations, of which the most general were the greater general sensitiveness of the left side as compared with the right, the greater sensitiveness to pain of women as compared with men, and the greater sensitiveness of young men of the wealthy classes both to

differences in locality (Weber's circles), and to pain as compared with men in the Boston 'Army of the Unemployed.'

Mr. Oliver Cornman, the next speaker, reported upon *An Experimental Investigation of the Processes of Ideation*, a study upon school children undertaken under the direction of Prof. Witmer. The children were asked to write as many words as possible in an interval of fifteen minutes, writing the words in columns. In general lists of from 200 to 400 words result, which are then classified and subjected to statistical treatment. It has been found that the directions given the children at starting are extremely important in determining the flow of associated words, and that the last third of the fifteen-minute period gives results most indicative of the individuality of the child. This investigation is understood to be still in progress.

The session of Friday afternoon was opened by the *Presidential Address* of Prof. Cattell, of Columbia College, who described the history and recent progress of psychology and the part played in its development by experiment and measurement. Psychology is by no means a new science, but its growth during the last few years has been rapid, and it now rivals the other leading sciences in productiveness of research and publication and in academic position. Science is either genetic or quantitative, and psychology is advancing in both directions. The problems that can be treated in the laboratory were reviewed, and it was claimed that these have added directly and indirectly new subject matter and methods, have set a higher standard of accuracy and objectivity, have made some part of the subject an applied science with useful applications, and have enlarged the field and improved the methods of teaching psychology. In conclusion, the relations of psychology to the other sciences and to philosophy were reviewed and their interdepen-

dence was emphasized. The address will be printed in the March number of *The Psychological Review*.

The President's address was followed by an informal communication from Prof. Ladd, of Yale, upon the *Direct Control of the Retinal Light*. After a description of the phenomenon (upon which the speaker has contributed a brief paper to the *Psychological Review*, I., 351) a syllabus of simple experiments for observing it was distributed and coöperative aid in its study solicited.

The next speaker was Prof. Strong, and his topic *Consciousness and Time*. The paper was a critique of the views presented in the Presidential address of Prof. James at the Princeton meeting. It was then argued that the perception of passing time involved a successive unity of consciousness in addition to the simultaneous unity required for the perception of likeness and difference. Prof. Strong, on the contrary, held that a successive unity is an impossibility, and that the consciousness of succession being in its nature retrospective, all knowledge of passing time must be representative, thus making the ordinary simultaneous unity of consciousness all sufficient. This paper will appear in the *Psychological Review*.

The afternoon session concluded with the paper of Brother Chrysostom on *Some Conditions of Will Development*. These conditions, the speaker considered, fall under two heads: the intrinsic, or such as depend on the voluntary agent, and the extrinsic, or such as act on him from without. The first of the intrinsic conditions is the nature of the will itself, which is indeterminate, at least as to the means that it shall employ. Objection to this view based on 'Double Consciousness' does not hold. The will is, however, determined to a certain extent by habit and intellect, and heredity and environment exercise a marked influence upon it. Environment itself, however, is partly sub-

ject to will and herein lies the great opportunity of ethical improvement.

The paper of Prof. Lloyd, of the University of Michigan, on *A Psychological Interpretation of the Rules of Definition in Logic*, though in the hands of the Secretary, was omitted because of the fulness of the program.

The most generally interesting and the most fully attended session of the Association was that of Saturday morning, when a discussion on *Evolution and Consciousness* brought together as participants Professors James, Cope, Baldwin, Minot and Ladd. Prof. James in opening the discussion sketched in brief the several aspects of the general question upon which psychological interest is more or less centered.

1. How ancient is consciousness in the world at large? To this question Clifford, Fechner and others have replied with a doctrine of atomic souls, making consciousness coeval with the universe, while Spencer and others again have advanced theories which place its entrance relatively late in cosmic development. The monadism of Leibnitz and the current doctrines of the soul are still other coördinate theories. 2. Is consciousness a genuine dynamic agent in the psycho-physical combination or merely an epiphenomenon? Here, it was said, the leaning of all the younger workers and of some of the elder is toward automatism, or psycho-physic parallelism, though others of the elder men still contend for a genuine effect of mind upon its bodily partner. 3. In the field of individual consciousness the question is that of nativism and empiricism; what in the consciousness of the child, for example, is inherited and what is acquired? Here the balance of current opinion dips heavily toward nativism.

Prof. Cope, of the University of Pennsylvania, who followed, spoke from the platform of zoölogical evolution. In these mat-

ters the point of view is all important. Darwin was an oecologist, Weismann and the Neo-Darwinians are mostly embryologists and their views are influenced thereby. The real history of evolution, however, the facts apart from any speculation about them, lies in the field of the paleontologist, and by him such questions must be settled.

After rapidly outlining the position of the Neo-Darwinians, the speaker indicated the sort of evidence that had led him to the opposite view. With regard to consciousness he remarked that the only systems in man that were abreast of evolutionary advance were the nervous system (the physical representative of consciousness) and the reproductive system; the rest is that of the eocene mammals. The course of evolution has, on the whole, been upward and purposeful. For this, physical and chemical forces cannot account, nor can theories of chance variation which make consciousness useless; consciousness itself has been an active participant. In the individual—at least in the representative activities of mind—consciousness may be conceived to affect the qualitative relations of the physical energy used, though not the quantitative relations. In the presentative activities, on the contrary, both are physically determined. The control in representative thinking is sufficient to make consciousness a real dynamic agent.

The next speaker was Prof. Baldwin, of Princeton, who, while concurring in the main with the previous speaker, deprecated the conception of mind as an extraneous something thrust in from without, and advocated the standpoint of monism.

Prof. Minot, of the Harvard Medical School, spoke for the Neo-Darwinians and embryologists. Admitting the facts that had been advanced by Prof. Cope in favor of the Neo-Lamarckian position, the speaker found himself unable to accept the infer-

ences drawn from them, and totally unable to conceive how the experiences of the adult can in any way be communicated to the embryo, the development of which he was forced to look upon as regulated by purely mechanical causes. With regard to life itself, however, the tendency of present biological thought is away from purely mechanical views; living and non-living matter are not the same thing. Consciousness is coextensive with life. While it does not break into the stream of physical energy, it selects among the possible transformations of that energy and thus has its effect without being itself any form of energy.

Prof. Ladd's position was that of an unequivocal idealist. He denied that consciousness in the world or in the individual could in any way be derived from a combination or modification of physical things. The very concepts of physics, energy and the like, can be derived from consciousness alone and have no meaning apart from it. Consciousness plays an active part in the psycho-physical partnership, and the struggle for existence is a psychical struggle. He reminded psychologists further that even the physicist's cardinal principle of the conservation of energy is yet far from demonstrated for cerebral action, or even for the action of the simple nerve-muscle machine, and ventured the prediction that that principle would undergo modification at the hands of the physical scientists themselves.

The question was then thrown open for general discussion, in which Professors Fullerton, Hyslop, Strong, Miller and Mills took part; and the whole was finally concluded by brief rejoinders from several of the original speakers.

At the afternoon session on Saturday, Prof. Patrick, of the University of Iowa, reported on *An Experiment on the Effects of Loss of Sleep*. The subject of this experi-

ment, a healthy young man, was kept without sleep for ninety successive hours. Every six hours elaborate physical and mental tests were made upon him, and at the end of the ninety hours the depth of his sleep was tested every hour through the ten and a half that he continued to sleep.

During the ninety hours of waking, the subject gained slightly in weight, though his only additional food was a light lunch taken just after midnight, but lost even more during the period of sleep that followed. The results of the tests may be briefly summarized as follows: The loss of sleep appeared to cause little loss of general mental activity; sharpness of vision, discrimination of taste sensations and possibly rapidity in reaction-times involving discrimination increased. Simple reactions, the pulse rate and the adding of figures were somewhat slowed. Muscular power was also somewhat lowered. In several of these, however, the expectation of the end of the test caused a return to near the normal during the last half day. Hallucinations of vision, due probably to the unusually prolonged stimulation of the eyes, were observed. The shortness of the period of sleep required for entire recovery gives ground for the belief that sleep is a relative matter, and that, in spite of being kept as fully awake as a man could be, the subject nevertheless was more or less of the time in a state of partial somnolence.

The second paper was a brief report by Prof. Mills, of McGill University, on *Further Researches on the Psychic Development of Young Animals and its Physical Correlation*. His researches upon pure-bred dogs reported last year have now been extended to mongrel dogs, the cat, rabbit, guinea pig and birds, and their results will soon be published. The mass of details involved prevented more than an announcement of the work accomplished.

Prof. Witmer's paper on *Variations in the*

Patellar Reflex as an Aid to Mental Analysis was next read. It contained an account of a long and elaborate study of the knee-jerk and its variations as a preliminary to its use as an index of psychical activity in studies of emotion. The varied details of the paper forbid brief presentation; certain bilateral forms of experiment, however, may be mentioned as of especial interest.

The fourth paper was that of Prof. Hyslop, of Columbia, entitled *Experiments on Induced Hallucinations*. In it were reported with critical comment a considerable set of observations by a lady of Prof. Hyslop's acquaintance, on hallucinations secured by the method of 'crystal vision.' Few or none could be traced by the observer to actual experiences, but some may have had that origin. Two or three would lend themselves to a telepathic explanation, but are by no means definite enough to have any confirmatory force in favor of such a theory. Perhaps the greatest interest in such hallucinations is the possible light which their examination may throw upon normal mental action.

The closing paper of the session was by Prof. Newbold, of the University of Pennsylvania, on *Dream Reasoning*. Three cases were described, one where the subject-matter was mathematical, one in which it was linguistic, and one in which it was archeological, the last two coming from the experience of a single person. In all three the dream reasoning lead to results that were valuable in waking life.

At the regular business meeting held after the discussion Saturday morning the following officers were elected: President, Prof. G. S. Fullerton, University of Pennsylvania; Secretary and Treasurer, Dr. Livingston Farrand, Columbia College; Members of Council, Profs. E. H. Griffin, Johns Hopkins University, and E. C. Sanford, Clark University.

The following gentlemen were elected

to membership: Prof. E. D. Cope, University of Pennsylvania; Prof. C. S. Minot, Harvard Medical School; Mr. J. E. Lough, Harvard; Dr. E. A. Singer, Harvard; Dr. N. Wilde, Columbia; Dr. C. H. Bliss, University of the City of New York; Dr. Franz Boas, New York; Mr. Warner Fite, Williams College; Prof. J. E. Creighton, Cornell; Dr. H. Austin Aikins, Western Reserve; Dr. W. G. Smith, Smith College.

The report of the Secretary and Treasurer showed a membership of sixty-five and a balance in the treasury of over \$290. A vote of thanks for the hospitality received was unanimously passed. The fixing of the time and place of the next meeting was left in the hands of the incoming President in coöperation with the Presidents of the other Societies. It was voted that any members attending the meeting of the International Psychological Congress in Munich next summer should, on notification to the Secretary of the Association, be empowered to act as delegates from the Association.

Between the morning and the afternoon sessions on Saturday an informal meeting of those interested in the formation of a Philosophical Society, or the organization of a Philosophical section within the Psychological Association, was held, and at the afternoon meeting the matter was brought before the Association and by vote referred to the Council with full power to act.

EDMUND C. SANFORD,
Secretary for 1895.

CLARK UNIVERSITY.

*TENTH ANNUAL MEETING OF THE IOWA
ACADEMY OF SCIENCES.*

THE Iowa Academy of Sciences met for its tenth Annual session in Des Moines, January 1st, 2d and 3d, 1896, in the Horticultural rooms at the Capitol Building. The attendance and interest at this meeting surpassed all previous gatherings of the Academy and were very encouraging.

Prof. H. W. Norris in his address as retiring President took for his subject 'Needed Changes in Scientific Methods.' The address was full of excellent suggestions, both for scientific workers and for the public, who look to scientific investigation for assistance in economic problems.

'The Homologies of the Cyclostome Ear,' read by Prof. Norris, presented evidence that the ear of Cyclostomes, though differing so markedly from that of ordinary vertebrates, is still capable of being homologized perfectly with the ear in other orders.

Prof. C. C. Nutting read a very interesting paper on 'Origin and Significance of Sex,' setting forth the theory of Geddes and Thompson as presented in their work on the evolution of sex and detailing some very interesting studies of his own on the development and determination of sex in Hydroids.

Prof. T. Proctor Hall presented papers on 'Unit Systems and Dimensions of Units,' 'Gravitation,' 'A Mad Stone.' In the last paper he described a peculiar absorptive power of the rock, being able to absorb one-half more water by volume than the rock itself.

Prof. L. W. Andrews presented the following papers: 'The Influence of Moisture on the Ignition Point of Sulphur,' and 'The Reduction of Sulphuric Acid as a Function of the Temperature.'

Prof. W. S. Franklin presented a paper on 'A New Electrical Generator for Oxygen and Hydrogen.' Prof. L. A. Youtz gave an account of the Indianola clay and pottery works.

Prof. L. H. Pammel gave an account of the flora of Western Iowa, calling attention to peculiar Western plants found on the bluffs along the Missouri river. In a second paper with Prof. F. Lamson-Scribner, he enumerated the grasses found between Jefferson, Iowa, and over the Rocky Mountains—the gradual change from blue grass